

THE ANTHROPOCENE AND THE GLOBAL ENVIRONMENTAL CRISIS

Rethinking modernity in a new
epoch

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HUMAN DESTINY IN THE ANTHROPOCENE

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Here I put forward eight rhetorical propositions about the Anthropocene and what it means for how we think about the human future.

Proposition 1. Nature has an entirely new character

In all previous instances, transitions from one division to the next in the Geological Time Scale came about because the great forces of nature came together in a particular way, but always unconsciously and unintentionally. In the Anthropocene, the 'human imprint on the global environment has now become so large and active that it rivals some of the great forces of Nature in its impact on the functioning of the Earth system' (Steffen et al. 2011). Unlike geological forces such as weathering, volcanism, asteroid strike, subduction and solar fluxes, this new 'force of Nature' is radically distinct – it contains the element of volition. It expresses will.

Anthropogenic impacts – increases in carbon dioxide in the atmosphere, but also cross-global species invasion, disturbance to the nitrogen cycle and so on – do not just happen but are the consequence, intended or otherwise, of *decisions* taken by human minds. In nature, as we have always understood it, no decisions are made.

If in the Anthropocene humans have invaded the domain of geology we must remind ourselves that the forces at work in geology – physical impacts, chemical reactions, temperature changes and heat conductivity – are forces that behave involuntarily. Humanity is perhaps better described as a *geological power* because we have to consider its ability to make decisions as well as its ability to transform matter. This power as a force injected with *will* is an insight that was turned around by Schiller when he wrote: 'Force is depersonalized will.' Unlike forces of nature, it is a power that can be withheld as well as exercised. In claiming that the geological

evolution of the Earth is now infused with human will I am not positing any kind of Teilhardian noösphere; I am saying that, while there is nothing 'behind' the forces of nature (they are just forces), there is something 'behind' human action, will, that can no longer be separated from it in Earth history. This is so even if, as Vernadsky (2005) observed, the riddle of how thought can change material processes remains unsolved.

So for the first time in the Earth's 4.5 billion-year history we have a non-physical force or power mixed in with physical forces. And this new force can be integrated only imperfectly into the system of geodynamics used to explain the geological evolution of the planet. The other forces are, in principle, quantifiable and predictable (notwithstanding quantum mechanics), so that, for example, the next Ice Age is expected to arrive in 50,000 years. The new force can be included only to the extent that human activities are predictable, which lends a new level of unpredictability to the Earth system. (The uncertainty about how this new force will behave is the primary reason for the wide variation in warming projections of IPCC scenarios.) Nevertheless, it now seems certain that as long as humans are on the planet all future epochs, eras, periods and so on will be hybrids of physical forces and this new power. This suggests that modern technological humans should be seen not as a new force to be *added* to the pre-existing natural ones, but as a unique power that in some sense now *infuses* the natural ones and interferes, for good or ill, with their operation.

The inference that the Anthropocene is a profoundly new kind of division in the Geological Time Scale can be reached another way. If the International Commission on Stratigraphy adds the Anthropocene to its geochronology, it will need to decide, on the basis of stratigraphic indicators, whether it is best classified as a geological age, an epoch or a period. Wally Broecker even intimates that it may be an era, the Anthropozoic era (Langmuir and Broecker 2012, 645). Jan Zalasiewicz and his colleagues (2010) suggest that deeming it an epoch – that is, longer than an age but shorter than a period – would be a conservative but appropriate decision; but they go on to add that if society does not respond soon to the signs of climate disruption then it may be necessary to upgrade the Anthropocene from an epoch to a period.

In other words, we are entering a geological episode whose designation depends not only on gathering and evaluating the available data but also on human impacts on the Earth system that *have not yet occurred*. The verdict on the Anthropocene reached by the International Commission on Stratigraphy in the next two or three years could be invalidated not by the *discovery* of new evidence that already exists but by the *generation* of new evidence that will appear in the future. That is impossible for every previous decision concerning the Geological Time Scale.

Proposition 2. Modernity is impossible in the Anthropocene

In 2012 the eminent US climate scientist Kevin Trenberth made a striking statement:

The answer to the oft-asked question of whether an event is caused by climate change is that it is the wrong question. All weather events are affected by climate change because the environment in which they occur is warmer and moister than it used to be.

(Trenberth 2012)

Climate science is now telling us that the modern division of the world into a box marked 'Nature' and one marked 'Human' is no longer tenable. In the climate system the natural and the human are mixed up, not merely added, and their influences cannot be neatly distinguished. Furthermore this is true of the Earth system as a whole, because disturbing the climate inevitably means disturbing all components of the Earth system.

In short, *everything* is now in play. Every cubic metre of air and water, and every hectare of land, now has a human imprint. Just how completely humans have overrun the planet is illustrated by the following astounding fact. Imagine we could weigh all of the vertebrate animals on the Earth's land surfaces. The creatures can be divided into three classes: *wild animals*, covering everything from elephants, camels and polar bears to rabbits, kangaroos and wolves; *domesticated animals*, including cows, sheep, pigs, cats and dogs; and *human beings*. If we weighed them all, worked out their mass measured in millions of tonnes, what would be the percentages falling into each of the three classes?

Canadian scientist Vaclav Smil has performed the calculation (Smil 2011). It turns out that (measured in dry weight) humans account for 30 per cent of the total mass of all animals, and domesticated animals account for 67 per cent. That leaves all of the wild animals on the Earth's surface accounting for no more than 3 per cent. In the words of Smil: 'The zoomass of wild vertebrates is now vanishingly small compared to the biomass of domestic animals.' So peering into the box marked 'Nature' will reveal few wild animals, contrary to the image, created by wildlife documentaries, of endless plains teeming with wildebeest.

What was distinctive of the social sciences and humanities that emerged in eighteenth and nineteenth-century Europe was not so much their aspiration to science but their 'social-only' domain of concern. Sociology, psychology, political science, economics, history and philosophy rest on the assumption that the grand and the everyday events of human life take place against a backdrop of a blind and purposeless nature. Only humans have agency. Everything worthy of analysis occurs in the sealed world of 'the social', and where the environment is taken into account – in environmental history, sociology or politics – 'the environment' in question is the *Umwelt*, the natural world 'over there' that surrounds us and sometimes intrudes on our plans, but always remains separate.

Yet a mere 'taking into account' misses the essence of the new epoch. We can no longer draw a diagram with 'Society' nested within a larger circle marked 'Nature'. The point of the announcement in the year 2000 of the Anthropocene's arrival is that we now live in an epoch in which the human inheres in the total functioning of the natural world. Until this fact is internalised, social science and humanities' scholars will fail to understand the politics, sociology or philosophy of climate change in a way that is true to the science.

If our future has become entangled with that of the Earth's geological evolution then, contrary to the modernist faith, it can no longer be maintained that humans make their own history, for the stage on which we make it has now entered into the play as a dynamic and capricious force. And the actors too must be scrutinised afresh. If on the Anthropocene's hybrid Earth it is no longer plausible to characterise humans as the rational animal or as God's chosen creatures or as just another species, what kind of being are we? Suffice it here to say that with climate disruption upon us the appropriate response to the idea of the human as the rational animal is a loud guffaw.

By the same token, the biologicistic account of humans as animals with instincts, drives and selfish genes becomes even more indefensible in the Anthropocene because it is precisely because humans are *not* like other animals that the new epoch has arrived. The human has always been the anomaly, the creature both natural and unnatural. The Anthropocene is so momentous because nature's anomaly is now restructuring nature itself.

Proposition 3. Social scientists must become geophysicists

At the 2012 conference of the American Geophysical Union, geophysicist Brad Werner presented a paper with a blunt title: 'Is Earth f**ked?' (Werner 2012). The author is the Director of the Complex Systems Laboratory at the University of California San Diego, and he posed in a formal conference setting the question many at the meeting have for some time been asking in the coffee breaks. His approach to the question of Earth's future has some unnerving implications for social scientists. He is building a dynamic model known as a 'global coupled human–environmental system' (Werner 2012). In addition to the usual kinds of equations capturing elements of the Earth system, the model incorporates the activities of humans represented in a module he calls 'the dominant global culture', which essentially describes the globally integrated system of resource use and waste generation driven by the insatiable need to grow and the political institutions committed to perpetual expansion.

The essential problem for the Earth – for us – is that there is a mismatch between the short timescales of markets and the political systems tied to them, and the much longer timescales that the Earth system needs to accommodate human activity. The climate crisis is upon us not because markets aren't working well enough but because the market system is working too well in accelerating global energy and material cycles. Technological progress and the globalisation of finance, transport and communications have oiled the wheels of the human-willed components of the planetary system, allowing them to accelerate. Put another way, the tempo of the market's metabolism is much faster than that of the Earth system, yet in the Anthropocene they no longer operate independently.

For Werner, all solutions embedded in the dominant culture – including system-compatible ideas like cost-benefit analysis, global agreements, carbon prices and the structure of interest group politicking – cannot slow the human component

of the planetary system. Only radical activism that disrupts the dominant culture – including ‘protests, blockades and sabotage’ – opens up the possibility that the Earth may not be f*cked.

Dipesh Chakrabarty has characterised the Anthropocene as the epoch in which human history and geological history converge (Chakrabarty 2009 and this volume). Now we have in Brad Werner a geoscientist integrating *human* processes with *Earth system* processes to give us a planetary model in which human and geological history rub up against each other. In the Anthropocene, any geoscientist who models an Earth system that excludes humans is stuck in Holocene thinking; and any social scientist who analyses ‘human systems’ isolated from Earth system processes is stuck in a world of modernity, the world of the epistemological break, that is no longer consistent with scientific understanding.

While social scientists puzzle over the political and social failures that have brought about irretrievable climate disruption, Werner writes: ‘It’s really a geophysics problem. It’s not something that we can just leave to the social scientists or the humanities.’ Before the advent of the new geological epoch such a statement would have been preposterous; but now social scientists in the Anthropocene have no choice but to become geophysicists as well.

Karl Marx famously argued that the historical contradictions within the capitalist system become so acute that the pressure for revolution boils over. He claimed that his theory of revolution is ‘scientific’. In truth, the mechanisms of social transformation he identified could never follow a foreseeable path in a messy social-only world. Now we have a theory of revolutionary change with a stronger claim to being scientific, a model of geophysical dynamics that incites protests, blockades and sabotage to overthrow the dominant culture, a model that links geophysics to Naomi Klein’s call for social disruption (Klein 2014).

Proposition 4. The iron law of progress has been rescinded

If the Holocene’s 10,000-year stretch of climatic constancy made civilisations possible, what does it mean for the Holocene to come to an end? What does it mean for humankind to be entering an era of climatic volatility, with a rate of warming rarely matched in the palaeoclimate record? The most immediate implication is that the principal assumption of the contemporary world, that of endless progress, now looks untenable. We are inclined to forget how deeply entrenched this assumption is; it is the grand narrative that will not die, the storyline of daily decision making in public, corporate and private life.

It has often been noted that utopian political movements are a materialised form of the Christian promise of salvation. As Hans Jonas observed, among utopians it did not take long for the *ideal* of progress to harden into a *law*, a law of history (Jonas 1984, 163). The law of progress allowed those who understood it to know the future; to be a political actor then meant working to bring about more quickly that which is inevitable.

When the ideal became law the champions of social transformation – democrats, Marxists and liberators of all kinds – could believe that history was on their side. That is what it meant to be ‘progressive’, to side with history, and those radicals who opposed industrial expansion were sent to the margins, where they wallow today. Philosophers such as Hegel provided the dialectic motor for the iron logic of progress, but in the end the proof was there for all to see in the relentless advance of gross domestic product.

But what happens to the ideal of progress when the law fails, or proves to have been true only for an epoch that has now passed? The law can live on only at the price of denying the passing of the age of progress and pretending that the Anthropocene is something for scientists alone to worry about. Although the births of utopias are precipitated by times of great turmoil, all presuppose eventual stability and so the absence of conflict. Yet there will be no stability in the Anthropocene, especially if the expectations of abrupt change (tipping points, feedback effects, extreme events and so on) come to pass. Instead of investing in more growth we will be pouring resources into trying to climate-proof our lives – our cities, our coasts, our infrastructure, our houses and our food supplies. The dominant task will be to protect the gains of the past and manage the effects of climatic insecurity so that they do not spill into conflict. Whether the unfolding era will stimulate new liberation projects – post-Holocene ones – is to be seen.

Proposition 5. Humans can dream of utopia only while Gaia sleeps

On the road to every utopia, entrenched power structures and stubborn ‘human nature’ have been the hindrances. For utopians victory comes by way of a historical rupture, often an act of violence, which overthrows the old structures and forges a ‘new man’. But the rupture we now confront is not one of our making, or rather not one we have consciously brought about; it is not one to welcome but one to resist for it renders us less free, less powerful, and less able to build a New Jerusalem. The Moderns became convinced that human destiny would be shaped by what they believed. They believed in the human capacity to transform nature. But in the Anthropocene the Earth has been mobilised; it will not be subdued and now holds our fate in its hands.

Some leading thinkers have begun to grapple with the meaning of the new epoch now dawning and the all-crushing truth of climate science. In *Living in the End Times* Slavoj Žižek takes up the essential question for the left: with the shift to the Anthropocene, ‘how are we to think the link between the social history of Capital and the much larger geological changes of the conditions of life on Earth?’ (Žižek 2010, 331). Žižek declares that ‘materiality is now reasserting itself with a vengeance’ over intellectual labour (Žižek 2010, 330). That is true; yet he then reverts to the old social categories of capital and labour. For him the ground has not shifted and the task remains the remaking of the social and economic system to ‘solve’ the problem, confident that the Earth will obediently follow the programme.

For him, human agency, the first-born child of the Enlightenment, is undiminished: 'one can solve the universal problem . . . only by first resolving the particular deadlock of the capitalist mode of production' (Žižek 2010). Of course, socialist modes of production have proven just as contemptuous of Gaia (Josephson et al. 2013; Shapiro 2001).

Ulrich Beck seems to go much further in recognising that the unintended dynamics of capitalist modernisation 'threatens its own foundations' (Beck 2010, 255). Climate change demonstrates the impossibility of maintaining sociology's separation of social forces from natural ones and enforces 'an ongoing extension and deepening of combinations, confusions and mixtures of nature and society'. Quite so; yet Beck too immediately reverts to the familiar by insisting that climate change must be inscribed into the old categories (Beck 2010, 257; Hamilton 2012). He manages to reframe the destabilisation of the conditions of life on a millennial scale as a golden opportunity to achieve the progressive dream. Let us close our ears, he tells us, to 'depressing' talk of catastrophe and shun the 'negativity' of 'well-meaning green souls'. When the 'world public' (itself a utopian fantasy) wakes up to the fact that we are all in this together 'something historically new can emerge, namely a cosmopolitan vision in which people see themselves . . . as part of an endangered world . . .'. He entertains the poignant wish that a golden era of 'enforced enlightenment' and 'cosmopolitan realism' will dawn. Good luck with that.

Beck is the ultimate Modern whose implicit faith in reflexivity, our rationality, guarantees our autonomous capacity to respond to the world as it is. Yet is not the essential lesson of the climate crisis that reflexive modernisation has failed? The most striking fact about the human response to climate change is the determination *not* to reflect, to carry on blindly as if nothing is happening.

Responding to climate change requires, says Beck, a 'new contract between the managers of risk and the victims of risk in world risk society'. This new contract is little more than a minor rewriting of the terms of the old social contract, one from which the Earth itself, in its new incarnation as the Anthropocene, remains excluded. For Beck, ecology becomes a stimulus to solving poverty, inequality and corrosive nationalism (as long as we transcend the negativity of gloomy greens), but the old Earth lingers as the mere backdrop on which the human drama is played out.

So this is where we are. Modernity uprooted the social sciences from the earth. They became *hydroponic* disciplines, floating in the water of the social, sending out their roots to find nutrients supplied only by what humans do to each other, fed only by culture. But the drawback of hydroponics is that, without soil to act as a buffer, the plants die off quickly if anything goes wrong with the system. In the Anthropocene something is going wrong with the system, but to work out what it is our most prominent social scientists (with some noteworthy exceptions in this book) only know how to consult the hydroponics textbooks, where they find the old answers – change the mixture of micronutrients in the water.

The Moderns, including Žižek and Beck, are like Walter Benjamin's Angel of History, flying into the future but facing backwards, fleeing from a horrible past

of suffering and oppression but unable to see the destruction that lies ahead. For them the real is what is left behind and the future is only what the autonomous subject ends up creating. Few progressives have turned around to face the future; and one can see why, for the progressive who turns around can no longer be a progressive. In the Anthropocene, in addition to the past we seek to escape, now we have a future we want to avoid; we are squeezed from both ends, and any new emancipatory project must transcend the progressive categories of the past.

Proposition 6. It's too late to negotiate with the Earth

Under the old social contract individuals agree to abide by the rules while the state agrees to provide order and protect our liberties. Michel Serres has argued we must now negotiate a second contract, a contract with nature (Serres 1995). When we walked away from the state of nature we became a parasite on the planet, he wrote, only recently recognising we are poisoning our host. Reimagining ourselves in a symbiotic relationship is the sole means by which both humans and Earth can survive. Under the terms of this natural contract humanity will reject mastery 'in favour of admiring attention, reciprocity, contemplation, and respect'. The contract will grant nature rights and make reparations.

Michel Serres was writing in 1992, at a time when I would have agreed with him, so I don't want to be harsh. But today we must ask under which constitution does humanity have the power to grant rights to Nature? What can we pay back to the Earth? Is Nature keeping a record of our ecological debt? Do we hear the victim of humankind's rapacity plaintively calling to us for mercy? Can we expect Nature to be grateful if we deign to grant her contractual rights? Is not the imposition of victimhood merely the continuation of domination in another guise?

For two centuries people struggled for equity and justice, for a progressive reading of the social contract. Calling now for a second contract – an agreement of reciprocity and justice between humanity and Nature – projects an eighteenth-century conception of the social onto the Anthropocene Earth – a social world of laws, codes, obligations and penalties, of rights and responsibilities, imposed on an entity that knows nothing of these things. When Serres says we can reach a deal because we understand Nature's language of 'forces, bonds, and interactions' is this not a new and thinly disguised anthropic power grab?

In the two decades since Serres wrote, Earth system science has taught us that the globe to which we graciously offer a peace deal – the passive, predictable victim of our exploitation and neglect – existed only in our imaginations. The enlightened among us desire harmony, sustainability and cooperation, but these aspirations clash with the globe scientists now vividly describe using images of 'the wakened giant' and 'the ornery beast', of Gaia 'fighting back' and seeking 'revenge', a world of 'angry summers' and 'death spirals'. We are in no position to begin signalling our willingness to negotiate a contract with the Earth. Instead of talking restitution should we not be preparing for retribution?

Proposition 7. The Earth is indifferent to our love

The arrival of the Anthropocene has some far-reaching implications for environmentalism. Let me quote an apparently unquestionable claim: 'At the heart of modern environmentalism is the idea that the planet must be saved from further damage by humanity' (Lind 2011). Underlying such a statement is a view that, while humans commit rape and pillage, nature is passive and fragile and always our victim. Yet now we see that the planet has been disturbed from its resting state, jolted out of the exceptional era of climatic stability characteristic of the last 10,000 years. Now it has jumped onto an uncontrollable trajectory that is hazardous to human life. We must no longer see the Earth as a submissive repository for supplying resources or taking wastes, suffering in silence from our rapacity or neglect. The new understanding has been expressed most vividly by palaeoclimatologist Wally Broecker: 'The palaeoclimate record shouts out to us that, far from being self-stabilizing, the Earth's climate system is an ornery beast which overreacts even to small nudges' (Broecker 1995, 213).

If we have wakened the slumbering beast by poking and prodding it, the prudent course is firstly to stop. We cannot put it back to sleep, although the Prometheans hope to anaesthetise it with geoengineering (Hamilton 2013). There is no return to the peaceful conditions of the Holocene, at least not for a thousand years. But to provoke it further, as we continue to do, is foolishness on an epic scale.

So the task of environmentalism can no longer be to save the planet, for the Holocene planet we wanted to save has become something else, not the kind of thing that can be saved or protected. Our task now is to refrain from aggravating further an entity vastly more powerful than we are and whose 'psychology' we barely understand. Yes, the Earth still demands our respect, but it is a respect founded on trepidation rather than love (Stengers 2009). It is prudent, as Bruno Latour reminds us, to regard Gaia not as the all-loving, all-nurturing Mother Earth of the romantics but more like the half-crazed, bloodthirsty and vindictive goddess of the original Greek tales (Latour 2011).

Proposition 8. Modernity will fight to the bitter end

At the dawn of modernity Francis Bacon had a vision – to use science to found 'an empire of man over nature'. Man would use technology to hasten natural processes, a transformative power granted by God and distinctive of humans as creatures. For men like Bacon remaking nature could redeem humankind from the Biblical Fall and the misery of the world that followed. Technology and science would bring about what he named a 'second creation'.

Astonishingly, Francis Bacon was the first to write of hydroponics, in *Sylva Sylvarum* published posthumously in 1627. But it is his fable *New Atlantis* (published in the same year) that had a more enduring influence. In the story a council of wise men, schooled in natural philosophy, oversees the making of a new Eden in imitation of the first act of creation. Bacon referred to the council as Salomon's House or the College of the Six Days Works. The College serves as keeper of the

know-how to transform nature. Says the magus: 'The end of our foundation is the knowledge of causes, and secret motions of things; and the enlarging of the bounds of human empire, to the effecting of all things possible.'

New Atlantis was one of the first visions of the perfection of human society by means of the conquest of nature, a kind of *technicae paradisum*. Scientists would become Utopia's midwives, and throughout the history of modern science many of its leading practitioners have been content to assume the role. Fredrik Albritton Jonsson has traced some of the many ways Bacon's ideas were developed and applied, from early improvements in English agriculture to the ideology of manifest destiny that animated the nineteenth-century conquest of the American west (Albritton Jonsson 2014). The vision of a second creation reached its secular zenith in the United States in the post-war decades of the twentieth century, energised perhaps by the undreamed of power of nuclear fission that lay at the core of the military-industrial-university complex. Its deep-rootedness in the American psyche helps to explain why faith in geoengineering is stronger in the United States than in Europe, and perhaps why today some American evangelical Christians have been boarding cruise ships bound for the melting Antarctic where they have been caught broadcasting seeds in the expectation that the freshly exposed continent will blossom into a new Eden.

More seriously, we are witnessing a contemporary recovery of the idea of a second creation in the reframing of the Anthropocene as an event to be *celebrated* rather than lamented and feared. Instead of final proof of the damage done by human arrogance, a new breed of 'eco-modernists' welcomes the new epoch as a sign of our ability to transform and control (Hamilton 2013). They see it not as evidence of humankind's short-sightedness, foolishness or callousness, but as an opportunity for humans to realise their full potential. So American ecologist Erle Ellis (2011a) defends what he calls the 'good Anthropocene'. There are no planetary boundaries that limit continued growth in human populations and economic advance. 'Human systems' can adapt and indeed prosper in a hotter world because we are masters of transformation.

In this emerging view, as we enter the Anthropocene we should not fear transgressing natural limits; the only barrier to a grand new era for humanity is self-doubt. '[W]e must not see the Anthropocene as a crisis,' writes Ellis, 'but as the beginning of a new geological epoch ripe with human-directed opportunity' (Ellis 2011a). For eco-Pollyannas like Ellis, four centuries after Bacon, with modern science and technologies of Earth system engineering we finally stand ready to build the New Atlantis. Ellis is confident: 'We will be proud of the planet we create in the Anthropocene' (Ellis 2011b). Only romantic critics of technology and the gloomy scientists they quote in support stand in the way of the vision's realisation (Hamilton 2014). The eco-modern's determination to look on the bright side of the Anthropocene is reminiscent of Brian's song on the cross at the end of *Monty Python's Life of Brian*.

Just as Bacon understood Nature as a passive object to be manipulated once her secrets had been extracted, and saw the exercise of human creative power facing no

constraints, so today's eco-moderns understand the Earth as a 'system' that can be subjugated with knowledge and technological power. In his book *The God Species*, Mark Lynas fulfils the prophecy of the College of the Six Days Works. 'Nature no longer runs the Earth,' he declares. 'We do. It is our choice what happens here' (Lynas 2011, cover).

So the battlelines have been drawn. On one side are those who plan to force Gaia into total submission; on the other are those who believe attempting to do so is the ultimate folly. One hundred and thirty years ago, Nietzsche foresaw our dilemma: 'Inexorably, hesitantly, terrible as fate, the great task and question is approaching: how shall the earth as a whole be governed?' (Nietzsche 1968, 501). Except that in the Anthropocene we begin to see that the Earth as a whole is not an entity that takes kindly to being governed.

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